

Amendments To Claims

---

ai 1. (Currently Amended) A processor-based method for evolving a graph structure ~~determining a set of weights for a set of arcs of a graph structure~~ comprising the ~~step of~~ determining a genome representation for the evolving a set of weights for a set of arcs in the graph structure such that the arcs ~~of the graph structure~~ that participate in a substructure of the graph structure are in a close proximity in the genome representation.

2. (Original) The method of claim 1, further comprising ~~the step of~~ evolving the weights using the genome representation.

3. (Original) The method of claim 1, wherein ~~the step of~~ determining a genome representation comprises ~~the step of~~ determining a matrix which indicates an optimal arrangement of the weights in the genome representation in response to the interconnections among a set of nodes and the arcs of the graph structure.

4. (Original) The method of claim 3, wherein ~~the step of~~ determining a matrix comprises ~~the steps of~~:  
determining a connection matrix which indicates interconnections among the nodes and the arcs;  
determining a weight matrix which indicates an amount by which each element of the weight matrix is off a diagonal;  
determining a product matrix of the connection matrix and the weight matrix.

5. (Original) The method of claim 4, wherein ~~the step of~~ determining a matrix further comprises ~~the step of~~ determining a score by summing a set of elements of the

product matrix.

6. (Original) The method of claim 5, further comprising ~~the step of~~ minimizing the score by swapping one or more rows and columns of the matrix.

7. (Original) The method of claim 1, wherein the graph structure is a neural network.

Al 8. (Currently Amended) A processor-based method for deriving a genome representation for evolving a set of weights in a graph structure, comprising ~~the steps of~~:  
determining a substructure of the graph structure;  
determining an arrangement in the genome representation such that the weights that participate in the substructure are in a close proximity in the genome representation.

9. (Original) The method of claim 8, wherein ~~the step of~~ determining an arrangement comprises ~~the step of~~ determining a matrix which indicates an optimal arrangement of the weights in the genome representation in response to the interconnections among a set of nodes and the arcs of the graph structure.

10. (Original) The method of claim 9, wherein ~~the step of~~ determining a matrix comprises ~~the steps of~~:  
determining a connection matrix which indicates interconnections among the nodes and the arcs;  
determining a weight matrix which indicates an amount by which each element of the weight matrix is off a diagonal;  
determining a product matrix of the connection matrix and the weight matrix.

11. (Original) The method of claim 10, wherein ~~the step of~~ determining a matrix further comprises ~~the step of~~ determining a score by summing a set of elements of the product matrix.

12. (Original) The method of claim 11, further comprising ~~the step of~~ minimizing score by swapping one or more rows and columns of the matrix.

13. (Original) The method of claim 8, wherein the graph structure is a neural network.

14. (New) A computer-readable storage media that holds a program that when executed evolves a graph structure by determining a genome representation for evolving a set of weights for a set of arcs in the graph structure such that the arcs that participate in a substructure of the graph structure are in a close proximity in the genome representation.

15. (New) The computer-readable storage media of claim 14, wherein determining a genome representation comprises determining a matrix which indicates an optimal arrangement of the weights in the genome representation in response to the interconnections among a set of nodes and the arcs of the graph structure.

16. (New) The computer-readable storage media of claim 15, wherein determining a matrix comprises:

determining a connection matrix which indicates interconnections among the nodes and the arcs;

determining a weight matrix which indicates an amount by which each element of the weight matrix is off a diagonal;

determining a product matrix of the connection

matrix and the weight matrix.

17. (New) The computer-readable storage media of claim 16, wherein determining a matrix further comprises determining a score by summing a set of elements of the product matrix.

18. (New) The computer-readable storage media of claim 17, further comprising minimizing the score by swapping one or more rows and columns of the matrix.

19. (New) The computer-readable storage media of claim 14, wherein the graph structure is a neural network.

20. (New) A computer-readable storage media that holds a program that when executed derives a genome representation for evolving a set of weights in a graph structure by:

determining a substructure of the graph structure;  
determining an arrangement in the genome representation such that the weights that participate in the substructure are in a close proximity in the genome representation.

21. (New) The computer-readable storage media of claim 20, wherein determining an arrangement comprises determining a matrix which indicates an optimal arrangement of the weights in the genome representation in response to the interconnections among a set of nodes and the arcs of the graph structure.

22. (New) The computer-readable storage media of claim 21, wherein determining a matrix comprises:

determining a connection matrix which indicates interconnections among the nodes and the arcs;

determining a weight matrix which indicates an amount by which each element of the weight matrix is off a diagonal;

determining a product matrix of the connection matrix and the weight matrix.

23. (New) The computer-readable storage media of claim 22, wherein determining a matrix further comprises determining a score by summing a set of elements of the product matrix.

24. (New) The computer-readable storage media of claim 23, further comprising minimizing score by swapping one or more rows and columns of the matrix.

25. (New) The computer-readable storage media of claim 20, wherein the graph structure is a neural network.

26. (New) A processor-based method for designing a neural network, comprising:

determining a genome representation for a set of weights for a graph structure representing the neural network such that a set of arcs of the graph structure that participate in a substructure of the graph structure are in a close proximity in the genome representation;

evolving the weights using the genome representation.

27. (New) The method of claim 26, wherein determining a genome representation comprises determining a matrix which indicates an optimal arrangement of the weights in the genome representation in response to the interconnections among a set of nodes and the arcs of the graph structure.

28. (New) The method of claim 27, wherein determining a matrix comprises:

determining a connection matrix which indicates interconnections among the nodes and the arcs;

determining a weight matrix which indicates an amount by which each element of the weight matrix is off a diagonal;

determining a product matrix of the connection matrix and the weight matrix.

29. (New) The method of claim 28, wherein determining a matrix further comprises determining a score by summing a set of elements of the product matrix.

30. (New) The method of claim 29, further comprising minimizing the score by swapping one or more rows and columns of the matrix.